Sea Surface Temperature Sensor
Originated from: David O'Gorman on Wed, 27 Apr 2011

Originate from: David O'Gorman (OSU) on Wed, 27 Apr 2011

We are considering adding a sea 'skin temperature sensor (as opposed to 'surface' from a flow thru or equiv.) to the Wecoma, and would be interested in community input.

We were originally thinking of a 'sea snake' type unit with temperature sensors in a flexible tube that is hung over the side of the vessel, but we are now considering temperature sensors mounted on the inside of the skin of the vessel (backed by insulation). The idea being that it would take less tech time to operate and the installed unit would be more rugged.

We are looking for feedback on the following:

Are there any other methods we should be considering?

Is the data from this type of an installation less preferable than data from other types of installations (Sea Snake, IR, ??)

Are there any commercially available solutions?

What solutions are currently being employed throughout the fleet (aside from flow-thru 'surface' temperature sensors).

Please 'reply to all'

Dave

David O'Gorman
Marine Instrumentation Engineer - COAS
130 Burt Hall
Corvallis, OR 97331

Reply from Dale Chayes (LDEO) on Thu, 28 Apr 2011

> Are there any commercially available solutions?

SBE48 works well.
-Dale

From: "Tedski" (LDEO) on Thu, 28 Apr 2011

The SBE-48 that we have relies upon magnets to clamp TDXR to the hull.

Ted

Reply from: David Fisichella (WHOI) on Thu, 28 Apr 2011

Dave,

The SBE48 we use on the WHOI ships works well, though the magnets that hold it to the hull plate are prone to rust (a thin coating of something may prevent this). To get the best results theses units need to have a foam insulating cover, especially if used in a hot engine room space.

David

--
David Fisichella

Manager
Shipboard Scientific Services
Woods Hole Oceanographic Institution

Reply from George Tupper (WHOI) on Thu, 28 Apr 2011

Hello David,

I'm not an expert at all in skin measurements, but it occurred to me that if you truly want the sea surface (skin) temperature, how about an IR measurement? You know, those gadgets you can buy from varoius sources which measure the surface temperature of something by simply pointing the device at the surface to be measured?

George

Reply from Ted Koczynski (LDEO) on Thu, 28 Apr 2011

Hi David and Dave,
You must also remember that the hull clamped transducer will 'filter' the signal. If you need fine temp. structure, the signal might be masked by the thermal inertia of your hull material and it's thickness.

Ted Koczynski

Reply from: Thomas Wilson (SUNYSB) on Thu, 28 Apr 2011

David,

Just before the money ran out on our ferry instrumentation project a few years ago we were investigating putting an IR thermometer aboard to measure skin temperature. I went into my notes and we were looking at a German company called Heitronics. Their USA representative is a guy named Pete Winter, 908-647-0144, win@wintron.com

I just had a nice talk with Pete to refresh my memory. He recommended two units, both of which are voltage in and analog or RS232 out.

1) The CT11.asphalt (so called because it's optimzed to measure road surface tmperature for salt spreaders). Cost less than $2,500, accuracy about 0.5C.

2) KT19, $4,300, resolution 0.02 C, accuracy maybe a littel better than CT11.

Pete said that various scientists had tried to improve accuracy by having the thermometer regularly pivot to take measurements of black bodies at known temperatures, this helps improve accuracy some.

Hope this helps. If anyone actually buys an IR thermometer I'd be interested in your experiences.

Tom

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Thomas C. Wilson / Instrument Lab / School of Marine and Atmospheric Sciences
Stony Brook University / Stony Brook NY 11794-5000 USA

Reply from: David O'Gorman on Mon, 2 May 2011

Thanks to everyone for the feedback on this subject. The 48 looks like a pretty rugged solution. We have kicked around (and I thought that someone at rvtec mentioned having a system like this) having a string of sensors running down the (in) side of the ship (like one every 6" from above the waterline down to a meter or three). This would probably be trouble to calibrate/install/remove, but it would produce some interesting data. There would indeed be some low pass filtering done by the hull.
We have considered IR solutions, but the problems we have heard of with those are:
- How much (thickness) of the 'skin' are they actually sampling *
- They have to be cleaned on a regular basis
- They don't have as much resolution as a thermocouple/thermistor would.
- The 'auto black body calibration' involves moving parts exposed to the elements

*not that the inside-the-hull temperature sensor would score incredibly higher on this count.

Any more thoughts?
Thanks again,
Dave

P.S. For reference we also have an SBE 38 *right* at the intake for our tsg system that we will be retaining.

David O'Gorman
Marine Instrumentation Engineer - COAS
130 Burt Hall
Corvallis, OR 97331

Reply From: Thomas Wilson (SUNYSB) on Thu, April 28, 2011

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Tom

Reply from: Rich Findley on Mon, 2 May 2011

All,

Here is a comparison of an SBE 48 hull mount temperature sensor and an SBE 3S (remote) right at the bow intake. I didn't like the results so we stayed with the bow intake sensor. <Hull_vs_Remote.xls>

Regards,

Rich
